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| FORM PTO 1590 | U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371 | ATTORNEY'S DOCKET NUMBER: BE 3969 U.S. APPLICATION NO. (if known, see 37 CFR 1.51) 09/744400 |
| INTERNATIONAL APPLICATION NO.: PCT/FR99/01771 | INTERNATIONAL FILING DATE: 20 July 1999 | PRIORITY DATE CLAIMED: 24 July 1998 |
| TITLE OF INVENTION: PROCESS FOR THE PREPARATION OF A RESTRUCTURED MEAT HAVING A LAYERED STRUCTURE | | |
| APPLICANT(S) FOR DO/EO/US: Maurice FRADIN and Christian FRADIN | | |
| Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information: | | |
| 1. <input checked="" type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input checked="" type="checkbox"/> 4. <input checked="" type="checkbox"/> 5. <input checked="" type="checkbox"/> 6. <input checked="" type="checkbox"/> 7. <input checked="" type="checkbox"/> 8. <input type="checkbox"/> 9. <input type="checkbox"/> 10. <input type="checkbox"/> 11. <input type="checkbox"/> 12. <input type="checkbox"/> 13. <input checked="" type="checkbox"/> 14. <input type="checkbox"/> 15. <input type="checkbox"/> 16. <input checked="" type="checkbox"/> | This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. A copy of the International Application as filed (35 U.S.C. 371(c)(2)) a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. (see attached copy of PCT/IB/308) c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). A translation of the International Application into English (35 U.S.C. 371(c)(2)). Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)). a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). Item 11. to 16. below concern document(s) or information included: An Information Disclosure Statement under 37 CFR 1.97 and 1.98. An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. A FIRST preliminary amendment. A SECOND or SUBSEQUENT preliminary amendment. A substitute specification. A change of power of attorney and/or address letter. Other items or information: | |



International Preliminary Examination Report (PCT/IPEA/408) and annexes
 International Search Report (PCT/ISA/210)
 Application Data Sheet

24 JAN 2001

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| U.S. APPLICATION NO. 09/744400 | | INTERNATIONAL APPLICATION NO. PCT/FR99/01771 | | ATTORNEY'S DOCKET NO. BE 3969 | |
| 17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$ 1,000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$ 860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$ 710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$ 890.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$ 100.00 ENTER APPROPRIATE BASIC FEE AMOUNT = | | | | CALCULATIONS PTO USE ONLY | |
| | | | | | |
| Surcharge of \$130.00 for furnishing the oath or declaration later than 30 months from the earliest claimed priority date (37 CFR 1.492(e)). | | | | \$ | 130.00 |
| <input checked="" type="checkbox"/> CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE | \$ | |
| Total claims | 11 - 20 = | 0 | X \$18.00 | \$ | |
| Independent claims | 1 - 3 = | 0 | X \$18.00 | \$ | |
| MULTIPLE DEPENDENT CLAIMS(S) (if applicable) | | | + \$270.00 | \$ | |
| TOTAL OF ABOVE CALCULATIONS = | | | | \$ | 990.00 |
| Reduction of 1/2 for filing by small entity, if applicable. Applicant claims Small Entity Status under 37 CFR 1.27. | | | | \$ | |
| SUBTOTAL = | | | | \$ | 990.00 |
| Processing fee of \$130 for furnishing the English translation later than 3 months from the earliest claimed priority date (37 CFR 1.49(f)). | | | | \$ | |
| TOTAL NATIONAL FEE = | | | | \$ | 990.00 |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property | | | | \$ | |
| TOTAL FEES ENCLOSED = | | | | \$ | 990.00 |
| | | | | Amount to be refunded: | |
| | | | | charged: | |
| a. | <input checked="" type="checkbox"/> | A check in the amount of \$ 990.00 to cover the above fees is enclosed. | | | |
| b. | <input type="checkbox"/> | Please charge my Deposit Account No. 25-0120 in the amount of \$ to cover the above fees. A duplicate copy of this sheet is enclosed. | | | |
| c. | <input checked="" type="checkbox"/> | The Commissioner is hereby authorized to charge any additional fees which may be required by 37 CFR 1.16 and 1.17, or credit any overpayment to Deposit Account No. 25-0120 . A duplicate copy of this sheet is enclosed. | | | |
| SEND ALL CORRESPONDENCE TO: Customer No. 000466 Young & Thompson 745 South 23rd Street 2nd Floor Arlington, VA 22202 (703) 521-2267 facsimile (703) 685-0573 | | | | | |
| | | | By <u><i>Benoit Castel</i></u> Benoit Castel Attorney for Applicants Registration No. 35,041 | | |

09/744400

1007/1008 P01/P10 24 JAN 2001

PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Maurice FRADIN et al.

Serial No. (unknown)

Filed herewith

PROCESS FOR THE PREPARATION
OF A RESTRUCTURED MEAT HAVING
A LAYERED STRUCTURE

PRELIMINARY AMENDMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

Prior to the first Official Action and calculation of the filing fee, please replace page 3 of the specification as filed with page 3 as filed in the Article 34 amendment of 8 August 2000.

Please also substitute Claims 1-12 as originally filed, which appear on pages 10-13, with Claims 1-11 also filed in the Article 34 amendment of 8 August 2000. The replacement specification page and the pages containing Claims 1-11 are marked "MODIFIED SHEET" and are attached hereto. Following the insertion of Claims 1-11, please amend these claims as follows:

IN THE CLAIMS:

Claim 5, line 1, change "one of claims 2 to 4," to --claim 2,--.

Claim 6, lines 1 and 2, change "one of the preceding claims," to --claim 1,--.

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Claim 7, lines 1 and 2, change one of the preceding claims," to --claim 1,--.

Claim 9, lines 1 and 2, change "one of the preceding claims," to --claim 1,--.

Claim 11, lines 1 and 2, change "one of the preceding claims," to --claim 1,--.

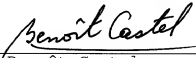
R E M A R K S

The above changes in the specification and claims merely place this national phase application in substantially the same condition as it was during Chapter II of the international phase, with the multiple dependencies being removed. Following entry of this amendment by substitution of the pages, only claims 1-11 remain pending in this application.

Respectfully submitted,

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By


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January 24, 2001

09/744400

2/PRT

JC07 Rec'd PCT/PTO 24 JAN 2001

WO 00/04795

PCT/FR99/01771

**PROCESS FOR THE PREPARATION OF A RESTRUCTURED MEAT
HAVING A LAYERED STRUCTURE**

The present invention relates to a process for the preparation of a restructured meat having a layered structure.

More particularly, it has for its object, but not exclusively, a process seeking to reconstitute meat portions, such as steaks, roasts, escallops or the like, having an appearance before cooking, a texture and organoleptic properties as close as possible to those of natural muscle, from a division of the muscles followed by operations of mixing and shaping products of this division if desired with additives.

Studies conducted by the applicants, and which gave rise to the filing of the patent application PCT/FR/87/00049, showed that until now such a result was obtained if the restructuring process gives to the final product a structure comprised of ultrafine layers of average surface, adhering to each other in a more or less regular manner, which maintains the layered texture.

The solution which thus was resorted to consisted in a process comprising the following operative steps:

- the fragmentation of a muscle, preferably hot (which is to say removed before rigor mortis) in strips or elongated pieces having a cross-section "of average surface" preferably of dimensions comprised between 20 and 30 mm,

- the formation of elongated blocks by superposition of said strips in a direction generally parallel to their length, with surface cooling of the strips, preferably by introduction of carbon dioxide snow,

- slicing the blocks in a direction perpendicular to their length to maintain the ultrathin sheets of average surface,

- restructuring as pieces of meat by assembly of the ultrafine layers in a shaping operation that does not destroy the multi-layer texture.

The term "ultrathin sheets" here designates sheets of a thickness substantially less than 1 mm and of which a certain proportion, at least in the structure, has a thickness comprised between 2/10 and 5/10 mm whilst the term "average surface" designates surfaces of the order of several cm².

To obtain layers having this level of thickness, the applicant proposed a slicing apparatus for blocks making use a rotatable disc moving in circular translation through the loaf secured to a turning circular plate, the blocks being brought to the slicing region by means of guide means with an axis parallel to the axis of the rotating disc.

The restructuring operation and the shaping operation of the meat was carried out by means of a device using two helicoidal screws with parallel axes, and reverse thread, driven in opposite direction such that the vanes turn toward each other, this screw opening into two respective outlet nozzles.

The invention more particularly has for its object to improve the preceding process so as to obtain products having a texture and organoleptic properties even closer to those of natural muscle.

It provides for this purpose a process of the type above, in which the ultrafine layers have a much greater surface, average greater than 10 cm².

As a result, after the restructuring phase of the meat, which is conducted under vacuum, there is obtained a much better texture and this in spite of the prejudice which held that, given the mechanical action exerted by the double endless screw of the restructuring device, the maximum surface of the layers could not exceed 1 to 2 cm².

Of course, the problem which is thus presented is the industrial creation of slices having such a surface, given that the slicing of blocks having characteristics of those described above, does not permit obtaining this result.

The invention therefore proposes to replace the fragmentation phase, mentioned above, with a fragmentation

phase making it possible to obtain plates of meat having a surface up to 5 to 500 cm² and a thickness of the order of 5 to 30 mm.

It has been discovered that during formation of the blocks in a mold in which the fragmented meat is compressed by a piston moved by an actuator, the plates of meat arrange themselves flat against each other, perpendicular to the axis of movement of the piston. Because of this, the slicing of the blocks can then take place parallel to the principal surfaces of the plates of meat. The obtained slices will thus be of relatively great dimensions (the surface can reach a maximum surface of the plates, namely about 500 cm²).

An embodiment of the invention will be disclosed hereafter, by way of non-limiting example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic view from above, of an installation for producing layered meat according to the invention;

Figure 2 is a schematic side elevational view of the installation;

Figure 3 is an axial cross-sectional view showing partially the extrusion tunnel with a double screw shown in the installation of Figures 1 and 2.

In this example, the complete installation for production of layered meat comprises essentially:

- a cooling tunnel 1 in which the pieces of meat to be treated circulate, that are obtained after fragmentation, which are present in the form of plates of meat,

- an elevator 2 which transfers them to a supply hopper for a mold for forming blocks 4 provided with a hydraulic jack 41;

- a storage with cylinders 5 in which the temperature of the blocks stabilizes,

- a presser 6 for holding the blocks for slicing,

- a cutting head contained in a protective frame (slicing station 7) and comprising two blades,

- a device for distribution of binder, an air lock 8 and a device 9 for forming under vacuum the layered meat from layers cut from the cutting head.

The cooling tunnel 1 is designed so as to ensure abrupt cooling, adapted rapidly to cool the surface of the pieces to a very low temperature, of the order of -25° to -35°C. In the case in which it is desired to obtain fresh products, there could be used, in addition to cryogenic refrigeration, mechanical refrigeration permitting drying the surface of the meat.

On the other hand, in the case of the production of quick frozen products, this cooling could be ensured by carbon dioxide snow.

The elevator 2 is preferably of the conveyor belt type circulating in a CO2 atmosphere.

The mold that forms the meat blocks is closed, at its end opposite the pusher PO which is the end of the piston of the jack 41, by a trap 43 whose opening and closing are controlled by a jack.

5 The control of the jack 41 is carried out such that the block formed between the pusher PO and the trap 43 will have a predetermined length. To this end, after having compressed a certain quantity of meat within the mold 4, the jack 41 retracts by a length equal to twice the unfilled length of the mold, which takes place with successive reciprocations of the jack to fill completely the mold, the decreasing fractions of the quantity of meat contained in the hopper will be pressed into the mold. The supply of the mold takes place by means of a hopper design such that each meat plate is present substantially perpendicular to the longitudinal axis of the mold.

10 After its forming, each block P is pressed by the jack into a first cylinder 51 of the store 5, which has four of them, and is driven in rotation such that the block will occupy successively various positions until its ejection from the last position toward the cutting head TC by a pushing jack 55.

20 The dwell time of the blocks in the store is determined such that the temperature of the meat will have time to stabilize at a value comprised between 0 and -2°C.

The pushing jack 55 is controlled so as to effect the continuous advance of the meat block which it ejects from the storage with cylinders 5 at low speed, in the slicing zone, for example between 6 and 10 mm/sec.

In this case the advance of the block between two successive cuts will thus be comprised between 0.36 mm and 0.6 mm, values which correspond to the thickness of the layer at the beginning of cutting.

The slicing is obtained by means of a rotating disc moved in circular translation through the block, secured to a circular turning plate, the disc turning in the opposite direction from the plate.

At the outlet of the slicing station 7, the layers of meat fall into a hopper T whose bottom F is closed by a sealed door P_1 actuated by a jack V_1 which controls the inlet to the air lock S in which is carried out sequentially a vacuum. The direction of reverse rotation of the disc and of the plate is such that the particles of meat fall into the hopper T during production of the layers. In contrast, in the case in which this direction of rotation is the same, the particles are projected in all directions and then fall in clumps into the hopper, thereby degrading the quality and homogeneity of the product.

The outlet of this air lock S, controlled by a second sealed door P_2 controlled by a jack V_2 , gives access to the vacuum-forming device 9.

Of course, the control of the doors P_1 , P_2 is alternated, the vacuum not being applied to the air lock S unless the inlet door P_1 is closed whilst the outlet door P_2 is open. Thanks to this arrangement, the forming device can function in a practically continuous manner, given that the loading of the air lock takes place during a very short time relative to the discharge time. Similarly, the forming device 9 is under continuous vacuum.

The forming device 9 in this case consists in an extrusion tunnel comprising two helicoidal screws 20, 21 whose axes are parallel and spaced from each other such that the screws 20, 21 inscribe substantially tangent cylinders.

These two screws 20, 21, whose helical blades are reversed from each other and are preferably covered with "Teflon", are driven by a motor assembly arranged so as to permit their rotation in opposite directions from each other while turning toward each other toward the interior of the assembly.

The mass of meat introduced into the inlet end of the tunnel 9 is pressed and compressed in the outlet section of the tunnel in which the pitch of the screws 20, 21 is reduced.

Each end section of the tunnel is connected to a separate outlet nozzle 200, 210 which comprises a truncated conical inlet portion in which engages the end of decreasing

diameter of the screw 20, 21, followed by a cylindrical portion.

The screws 20, 21 exert on the mass that they transfer, a deaggregation action in which the layers of meat are disposed according to privileged orientations, the speed of rotation of the screws (between 50 and 300 rpm) remaining low to preserve the integrity of the meat fibers. Because of this, at the outlet of the corresponding nozzle 200, 210, the texture of the final product, and in particular the orientation of its fibers, are merely those of natural muscle.

The product is present in the form of a continuous sausage which can be sliced so as to obtain pieces of reconstituted meat having the aspect of tournedos.

These pieces can be sold as fresh meat, in conventional distribution channels, or else be frozen.

Claims

1. Process for the preparation of restructured meat, comprising the following successive operations:

- fragmenting a muscle, preferably warm (before rigor mortis) into pieces,

- forming blocks from pieces whose surface has first been cooled,

- slicing the blocks in a direction perpendicular to their length to obtain ultrathin layers,

- restructuring into pieces of meat by assembly of the ultrathin layers in a non-destructive shaping operation to obtain the layered texture,

characterized in that the ultrathin layers have a surface on the average greater than 10 cm².

2. Process according to claim 1,

characterized in that said pieces, obtained at the end of the fragmentation phase, have the shape of plates having a surface of from 5 to 500 cm² and a thickness of 5 to 30 mm.

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3. Process according to claim 2,
characterized in that the formation of the blocks takes place within a mold (4) in which the fragmented meat is compressed by an actuator (41).

4. Process according to claim 3,
characterized in that the introduction of the fragmented meat into the mold (4) takes place such that the plates of meat are arranged flat against each other perpendicular to the axis of movement of the piston.

5. Process according to one of claims 2 to 4,
characterized in that the slicing of the blocks takes place parallel to the principal faces of the meat plates.

6. Process according to one of the preceding claims,
characterized in that the slicing takes place by means of a rotating disc moved in circular translation through the block secured to a circular turning plate, the disc turning in a direction opposite the plate.

7. Process according to one of the preceding claims,
characterized in that after the slicing operation, the layers fall into a hopper (T) whose bottom is constituted

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by a first door (P_1) controlling the inlet to an air lock (S) in which is sequentially carried out a vacuum, the outlet of this air lock (S) being controlled by a second door (P_2) giving access to the device for forming under vacuum (9).

8. Process according to claim 7,

characterized in that the control of said doors (P_1 , P_2) is alternate, the vacuum being applied to the air lock only when the inlet door (P_1) is closed whilst the outlet door (P_2) is open.

9. Process according to one of the preceding claims,

characterized in that the operation of forming towards place in an extrusion tunnel comprising at least one helicoidal screw (20, 21).

10. Process according to claim 9,

characterized in that the extrusion tunnel comprises two helicoidal screws (20, 21) with parallel axes separated from each other such that the screws inscribe substantially tangent cylinders, the helical blades of these screws being reversed relative to each other.

11. Process according to one of the preceding claims,

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characterized in that when the restructured meat is used as a fresh product, the cooling of the pieces constituting the blocks is ensured by mechanical cooling means and in that when the restructured meat is frozen, said cooling can be obtained by means of carbon dioxide snow.



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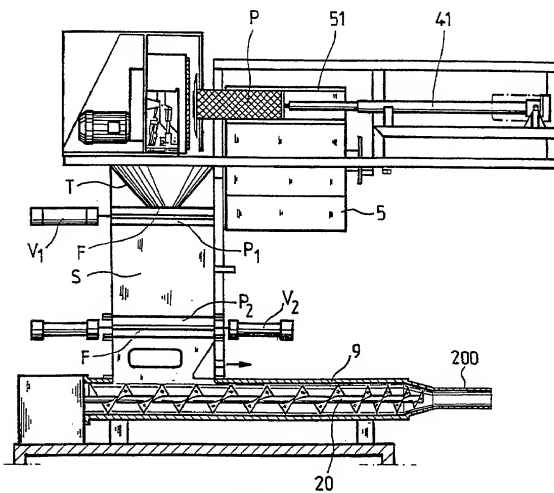


FIG. 2

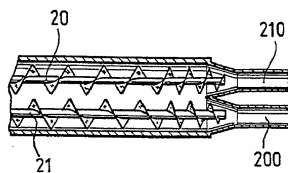


FIG. 3

Ref. BE 3969

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD FOR PREPARING RESTRUCTURED MEAT HAVING A FOLIATE STRUCTURE

the specification of which: *(check one)*

REGULAR OR DESIGN APPLICATION

☐ is attached hereto.

☐ was filed on _____ as application Serial No. _____ and was amended on _____ (if applicable).

PCT FILED APPLICATION ENTERING NATIONAL STAGE

☒ was described and claimed in International application PCT/FR99/01771 filed on 20 July 1999 and as amended on _____ (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

PRIORITY CLAIM

I hereby claim foreign priority benefits under 35 USC 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)

| Country | Application Number | Date of Filing (day, month, year) | Priority Claimed |
|---------|--------------------|--------------------------------------|------------------|
| France | 98/09596 | 24 July 1998 | yes |
| | | | |

(Complete this part only if this is a continuing application.)

I hereby claim the benefit under 35 USC 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.)

(Filing Date)

(Status—patented, pending, abandoned)

POWER OF ATTORNEY

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from Cabinet Dawidowicz as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

As a named inventor, I hereby appoint the registered patent attorneys represented by Customer No. **000466** to prosecute this application and transact all business in the Patent and Trademark Office connected therewith, including: **Robert J. PATCH, Reg. No. 17,355, Andrew J. PATCH, Reg. No. 32,925, Robert F. HARGEST, Reg. No. 25,590, Benoît CASTEL, Reg. No. 35,041, Eric JENSEN, Reg. No. 37,855, Thomas W. PERKINS, Reg. No. 33,027, and Roland E. LONG, Jr., Reg. No. 41,949,**

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PATENT, TRADEMARK OFFICE

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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(given name, family name)

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Full name of second joint inventor, if any: Christian FRADIN
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Inventor's signature _____ Date _____

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